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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/849,571	05/20/2004	Weidong Zhu	266923-000007USPT	6579

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EXAMINER
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NGHIEM, MICHAEL P

ART UNIT	PAPER NUMBER
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2863

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/849,571	<b>Applicant(s)</b> ZHU ET AL.	
	<b>Examiner</b> MICHAEL P. NGHIEM	<b>Art Unit</b> 2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2008 and 28 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15, 16, 47-54 and 56-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 56-59 is/are allowed.
- 6) ☒ Claim(s) 15, 16, 47-54, 60 and 61 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8-5-08, 7-28-08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

The Amendments filed on July 28 and 29, 2008 have been acknowledged.

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 28, 2008 has been entered.

### ***Information Disclosure Statement***

The information disclosure statement filed on August 5, 2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. The references not submitted are references D23, D40, D57, D58, D61, and D91. The references that are not legible are D90, D116, and D119.

The information disclosure statement filed August 5, 2008 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because references D32, D43, D50, D88, D89, D96, D111, D115, D125, D140, D149, and D150 each lack a publication date. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 47-54, 60, and 61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 47, 49, and 60, the system parameters and the system equations are not defined. Which parameters are system parameters and which equations are system equations?

Claims 47, 49, and 60, the first order eigenvalue sensitivity analysis is not defined.

Claims 47, 49, and 60 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: there are no relationships between the system parameters and equations and other claimed elements.

Claims 48, 50, and 61, the second or higher order perturbation process is not defined.

Claim 51, the outputted damage location on the structure should be based on the stiffness parameters.

The remaining claims are also rejected under 35 U.S.C. 112, second paragraph, for being dependent upon a rejected base claim.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 2863

Claims 47, 49, and 60 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The “number of system parameters is larger than a number of system equations” is not described in the original disclosure.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Weiss et al. (US 2003/0013541).

Regarding claim 15, Weiss et al. discloses a system (Fig. 19) for determining stiffness parameters of a structure (shaft 110, paragraph 0057), comprising:

- a sensor (1877) arranged to measure vibrations of a structure having a lengthwise much greater in magnitude than cross-sectional dimensional thereof (shaft

Art Unit: 2863

110's length versus cross-sectional dimensions, Fig. 11) and output to vibration information (paragraph 0116, lines 1-2);

- a stiffness parameter unit (62) for receiving said vibration information (paragraph 0116, lines 1-3), determining natural frequency data or mode shape (vibration frequency, paragraph 0116, lines 4-5; paragraph 0016, lines 6-8) of said structure (paragraph 0116, lines 2-5), and determining the stiffness parameters of said structure using said natural frequency or mode shape data (paragraph 0116, lines 4-5; paragraph 0016, lines 6-8);

- a damage information processor (61) for receiving said stiffness parameters and outputting damage information (data for non-perfect shaft vs. data for perfect shaft displayed via 257, paragraph 0159, lines 18-22, Fig. 25) comprising at least spatial damage information on said structure (symmetry/asymmetry data, paragraph 0160, lines 2-3, represents spatial damage information), said spatial damage information comprising a damage location along said lengthwise dimension (since the problem of asymmetry is along the length of the elongated member, paragraph 0160, lines 2-4).

Regarding claim 16, Weiss et al. further discloses a damage extent processor (61) for determining extent of damage information (257 shows deviations between data of non-perfect shaft and data of perfect shaft, Fig. 25).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 47, 49, and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weiss et al. in view of Bennighof (US 7,188,039).

Regarding claims 47, 49, and 60, Weiss et al. further discloses:

- determining said stiffness parameters using a first order perturbation process (paragraph 0066, lines 8-13).
- a number of system parameter is larger than the number of system equations (e.g. since the number of parameters in an equation is more than one, paragraph 0064, the two equations in paragraph 0064 have more than two parameters).

However, regarding claims 47, 49, and 60, Weiss et al. does not disclose a first order eigenvalue sensitivity analysis and one of the generalized inverse method, gradient method, or quasi-Newton method.



Art Unit: 2863

Nevertheless, Bennighof discloses a first order eigenvalue sensitivity analysis (column 5, lines 63-66) and one of the generalized inverse method (column 4, lines 5-12) for the purpose of determining structure (column 6, lines 9-13).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide Weiss et al. with the eigenvalue sensitivity analysis and inverse method as disclosed by Bennighof for the purpose of determining structure.

### ***Allowable Subject Matter***

Claims 48, 50-54, and 61 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claims 56-59 are allowed.

### ***Reasons For Allowance***

The **combination** as claimed wherein determining said stiffness parameters using a second or higher order perturbation process (claims 48, 50, 61) or said damage information processor outputting damage location information (claim 51) or a

Art Unit: 2863

random signal generating unit for generating first and second outputs; a random impact actuator for receiving said first and second outputs; and an impact applicator coupled to said random impact actuator and having an impact region; wherein said random impact actuator drives said impact applicator such that the force and arrival times of said impact applicator at said impact region are random (claim 56) is not disclosed, suggested, or made obvious by the prior art of record.

### ***Response to Amendment***

The amendment filed on July 29, 2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: claims 47, 49, and 60, "a number of system parameters is larger than a number of system equations".

Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Response to Arguments***

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Nghiem whose telephone number is (571) 272-2277. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Michael P. Nghiem/

Primary Examiner, GAU 2863

August 20, 2008